



Academic Press Dictionary of Science and Technology

Edited by
Christopher Morris



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plasma engine *Space Technology.* an electrical-reaction engine in which magnetically accelerated plasma is used as the propellant. Also, **plasma jet**.

plasmagel *Cell Biology.* a firm, viscous phase of the cell cytoplasm, usually located at the outer extremity of a pseudopodium, that can reversibly transform into plasmasol.

plasmagene *Cell Biology.* any self-replicating gene located in the cytoplasm of a cell rather than in the nucleus, including genetic material found within endosymbionts or organelles such as mitochondria.

plasma generator *Electronics.* any device, such as a plasma accelerator, plasma engine, or plasma torch, that generates a stream of high-velocity electrons and positive ions.

plasma gun *Electronics.* a machine that converts neutral gases into plasma by exposing them to intense thermionic flux.

plasma heating *Physics.* the increase of random thermal motion in a plasma by a variety of methods, such as ohmic heating, adiabatic compression, ion-wave or electron-wave heating, beam injection, and magnetic pumping.

plasma instability *Physics.* a sudden deformation in the quasi-static velocity or position distribution in a plasma as well as an abrupt change in the associated electromagnetic field.

plasma jet *Space Technology.* 1. a plasma engine. 2. the jetstream ejected by such an engine.

plasmalogen *Biochemistry.* one of a group of glycerol-based phospholipids in which the aliphatic side chains are not connected by ester linkages; a high percentage are found in the central nervous system.

plasma mantle *Geophysics.* a layer of plasma found immediately below the magnetopause, having a tailward flow of speeds from 100 to 200 km per second, and showing a decrease of density, temperature, and speed with the increase of depth inside the magnetosphere.

plasma membrane *Cell Biology.* a protein-containing lipid bilayer that surrounds a cell, defining the interface between the cell and its environment and providing a semipermeable barrier to the entry of molecules into the cell. Also, **CELL MEMBRANE**.

plasmopause *Geophysics.* the outermost point of the plasmasphere at which plasma density decreases sharply by a factor of 100 and more.

plasmapheresis *Medicine.* the removal of plasma from withdrawn blood, and reinjection of the packed cells; the procedure may be done as a therapeutic measure or to collect plasma components.

plasma physics *Physics.* a branch of physics that studies the properties and interactions of highly ionized gases.

plasma protein *Hematology.* any one of the hundreds of different proteins present in blood plasma, including carrier proteins, fibrinogen and other coagulation factors, immunoglobulins, enzyme inhibitors, and many other types of proteins.

plasma radiation *Physics.* the electromagnetic radiation emitted from a plasma, most of which is due to the free-free electron transitions.

plasma rocket *Space Technology.* a rocket propelled by a plasma engine. Also, **ELECTROMAGNETIC ROCKET**.

plasma sheath *Electronics.* an envelope of ionized gas that engulfs a spacecraft, moving through the atmosphere at hypersonic speed, and interferes with the transmission and reception of radio signals.

plasma sheet *Geophysics.* an area of hot plasma that starts at about 30,000 miles and reaches the orbital path of the moon; composed of particles whose thermal energies typically are 2 to 4 keV.

plasmasol *Cell Biology.* a fluid, soluble phase of the cell cytoplasm that can transform from and into plasmagel.

plasmasphere *Geophysics.* an area of relatively dense plasma surrounding the earth, extending 2 to 6 earth radii and composed mostly of protons and electrons having thermal energies not more than several eV.

plasma spraying *Materials Science.* a process that forms a dense, pore-free, polymer powder coating, using a torch that produces and controls a high-velocity inert gas stream (plasma) at temperatures in the 2500–8000 K range.

plasma tail *Astronomy.* the portion of a comet's tail composed of ionized gas.

plasmatherapy *Hematology.* the therapeutic use of blood plasma.

plasmatic *Hematology.* relating to or like plasma.

plasmatocytes *Entomology.* the most active white blood cells in insects; they can spread over surfaces of parasites forming a membranous capsule or become granular.

plasma torch *Engineering.* a torch used for cutting metals, in which a plasma gas is forced through an arc in a water-cooled tube, with consequent ionization and very high temperatures.

plasmatorrhesis *Cell Biology.* the bursting of a cell due to pressure exerted from within.

plasmatron *Electronics.* a gas-discharge tube in which a neutral gas, usually helium, is ionized so that it will conduct electricity across electrodes and, under certain conditions, amplify microwave frequencies.

Plasmaviridae *Virology.* a family of pleomorphic mycoplasma viruses having a circular, supercoiled dsDNA genome.

Plasmavirus *Virology.* the single genus of the family Plasmaviridae.

plasma wave *Physics.* a disturbance that propagates through a plasma, initiated by a localized displacement of charged particles in the plasma.

plasmic *Hematology.* 1. see **PLASMATIC**. 2. rich in protoplasm.

plasmid *Genetics.* a small, closed entity of double-stranded DNA forming an extrachromosomal self-replicating genetic element in many bacteria and some eukaryotes, often carrying genetic sequences that give the host cell a survival advantage such as resistance to antibiotics; widely used in genetic engineering as a cloning vector.

Plasmids

Plasmid: the etymology is -plasm, "living tissue," from *cytoplasm*; and -id, "diminutive," by analogy with *chromatid* and *plastid*. This term was defined in 1952 to embrace any extra-chromosomal hereditary determinant. This was intended to defuse the operationally vacuous dispute as to whether certain entities were "viruses" or "symbionts," on the one hand, or "genes" on the other. In fact, *plasmid* overlaps *virus* and *symbiont*: when either of the latter is inherited by the progeny of a given cell, and has a phenotypic effect, it may best be thought of as a plasmid.

Indeed, some bacteriophages (e.g., *Escherichia coli* P1) and many animal viruses are vertically transmitted in just this way. On the other hand, plasmids may move in and out of the chromosome (e.g., *E. coli* I bacteriophage, or the F plasmid), in which case they can be described as episomes. In 1990, 739 articles published had "plasmid" in their title, and the journal *Plasmid* is devoted to these entities.

Another fruit of this redefinition has been the reexamination of the origin of mitochondria and chloroplasts—it is

now generally accepted that these have come from symbiotic bacteria or cyanophytes.

The first plasmids to be extensively studied were the F(ertility) and RTF (resistance transfer factors) in *E. coli*. These are fairly small circular DNA molecules, and plasmid is often used in this narrower sense. Such plasmids have been indispensable workpieces in biotechnology. On the other hand, some megaplasmids are a large fraction of the normal chromosome; and the boundary between plasmid and chromosome segment depends on how one chooses to define the chromosome (e.g., minute and double minute chromosomes). Plasmids have been found to inhabit mitochondria in some fungi, and bits of DNA in the nucleus that were not regularly segregated like chromosomes might be considered intranuclear plasmids. While most plasmids are circular, some are linear (as indeed are some bacterial chromosomes).

Joshua Lederberg
Professor and President-Emeritus
The Rockefeller University
Nobel Laureate in Physiology or Medicine